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10/647,724	08/25/2003	Chang Liu	1201.68303	2167

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EXAMINER
DANG, PHUC T

ART UNIT 2818
PAPER NUMBER

DATE MAILED: 05/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/647,724

Applicant(s)

LIU ET AL

Examiner

PHUC T DANG

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-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 August 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☒ Claim(s) 11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 0803.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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DETAILED ACTION

1. This application is a CON of 10/008,719 filed on December 7, 2001 (U.S. Patent No. 6,642,129) which claims benefit of 60/307,976 filed on July 26, 2001.

Oath/Declaration

2. The oath/declaration filed on January 22, 2004 is acceptable.

Information Disclosure Statement

3. The office acknowledges receipt of the following items from the applicant:
Information Disclosure Statement (IDS) filed on August 25, 2003.

Specification

4. The specification has been checked to the extent necessary to determine the presence of all possible minor errors. However, the applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

5. Claim 11 is objected to because of the following informalities:

In claim 11, lines 6, the term "AFM" should change to -- atomic force microscope (AFM) --

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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6. Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dines et al., hereinafter "Dines" (U.S. Patent No. 6,574,499 B1).

Dines discloses an apparatus for forming a pattern on a surface of a substrate comprising:
a probe chip comprising a plurality of probes (32, Fig. 1) arranged in an array along the probe chip, the array being one-dimensional and two-dimensional, each of the plurality of probes having a tip;
a first actuator (70, Fig. 3) for moving the probe chip parallel to the surface of the substrate;
the probe chip further comprising a plurality of second actuators (72-1, 72-2 and 74, Fig. 3) operatively connected to each of the plurality of probes, for selectively raising or lowering the tip of each of the probes in a direction substantially perpendicular to the surface of the substrate. (Figs. 1-3).

Dines discloses all the features of the claimed invention as discussed above, but does not disclose a source connected to each of the plurality of second actuators for selectively actuating of second actuators.

Using a source connected to each of the plurality of second actuators for selectively actuating of second actuators is considered to be obvious in design of choice, since any actuator can operate by controller system. Thus, it would have been obvious to one having ordinary skilled in the art at the time the invention was made to perform a source connected to each of the plurality of second actuators for selectively actuating of second actuators for a purpose of improving a pattern on a surface of the substrate, as also suggested using a motor by Dines in lines 1-5, Fig. 8.

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Regarding claim 2, Dines discloses each of the second actuator is configured to move the tip of a selected probe away from the substrate upon actuation of a selected second actuator [Figs. 1-8, col. 10, lines 4+].

7. Claims 3-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dines et al., hereinafter "Dines" (U.S. Patent No. 6,574,499 B1) in view of Mirkin et al., hereinafter "Mirkin" (U.S. Patent No. 6,635,311 B1).

Regarding claims 3 and 5, Dines discloses an apparatus having a pattern of a pattern compound on its surface, the pattern being produced by a method comprising the steps of:
moving a chip (32, Fig. 1) over the substrate to position of a plurality of probes over the substrate simultaneously;

selectively actuating at least one of the plurality of probes to place the probes in one of in contact and out of contact of the substrate, while at least another of the plurality of probes remains out of contact with the substrate; at least the plurality of probes placed in contact with the substrate having a tip and the patterning compound on the tip [Figs. 1-3 and col. 10, lines 4-37].

Dines discloses all the features of the claimed invention as discussed above, but does not disclose wherein the pattern is formed by application of the patterning compound from the tip of the substrate.

Mirkin, however, discloses the pattern is formed by application of the patterning compound from the tip of the substrate [Abstract].

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It would have been obvious to one having ordinary skill in the art at the time the invention was made to apply the teaching of Mirkin to Dines discussed above such that the pattern is formed by application of the patterning compound from the tip of the substrate for a purpose of producing a desired pattern in submicrometer dimension.

Regarding claims 4 and 6, Mirkin discloses the patterning compound comprises at least two different types of patterning compounds including a biological compound [col. 10, lines 55-59].

It would have been obvious to one having ordinary skill in the art at the time the invention was made to apply the teaching of Mirkin to Dines discussed above such that the patterning compound comprises at least two different types of patterning compounds including a biological compound for a purpose of producing a desired pattern in submicrometer dimension.

Regarding claims 7 and 10, Mirkin discloses the substrate is a patterned integrated-circuit which comprises gold [col. 5, lines 50-57].

It would have been obvious to one having ordinary skill in the art at the time the invention was made to apply the teaching of Mirkin to Dines discussed above such that the substrate is a patterned integrated-circuit which comprises gold for a purpose of producing a desired pattern in submicrometer dimension.

Regarding claims 8-9, Mirkin discloses wherein the patterning compound comprises at least one of octadecanethiol (ODT) and mercaptohexadecanoic acid (MHA) and also the lines are formed by selected probes in contact with the substrate, the lines being less than 100 nm in width.

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It would have been obvious to one having ordinary skilled in the art at the time the invention was made to apply the teaching of Mirkin to Dines discussed above such that at least one of octadecanethiol (ODT) and mercaptohexadecanoic acid (MHA) and also the lines are formed by selected probes in contact with the substrate, the lines being less than 100 nm in width for a purpose of producing a desired pattern in submicrometer dimension.

8. Claims 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adderton et al., hereinafter "Adderton" (U.S. Patent No. 6,279,389 B1).

Adderton discloses an apparatus for applying a patterning compound to a substrate for nanolithography, the apparatus comprising:

A plurality of scanning probe microscope (SPM) instrument probes (92, Fig. 5) arranged in an array;

An actuator (140, 142, Fig. 6) operatively connected to each of the plurality of AFM probes for selectively actuating each of the probes, thus placing a tip of each of the selectively actuated probes in sufficient proximity to the substrate to allow application of the patterning compound thereto [Figs. 5-6 and col. 8, lines 63-col. 9, lines 65].

Using a plurality of scanning probe microscope (SPM) instrument probes and a plurality of atomic force microscope (AFM) is considered to be obvious variation in design, since the plurality of elements being the same are duplication of parts, thus would have been obvious to one having ordinary skilled in the art to use the plurality of scanning probe microscope (SPM) instrument probes and a plurality of atomic force microscope (AFM) in Adderton's reference for a purpose of reducing consuming time.

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9. Claims 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adderton et al., hereinafter "Adderton" (U.S. Patent No. 6,279,389 B1) in view of Massie (U.S. Patent No. 6,590,208).

Adderton discloses all the features of the claimed invention as discussed above, but does not disclose the apparatus comprising a scanner tube uses piezo-actuation for moving the probe chip.

Massie, however, discloses the apparatus comprising a scanner tube uses piezo-actuation for moving the probe chip [col. 3, lines 43-67].

It would have been obvious to one having ordinary skilled in the art at the time the invention was made to apply the teaching of Massie to Adderton discussed above such that the apparatus comprising a scanner tube uses piezo-actuation for moving the probe chip for a purpose of improving atomic force microscope (AFM).

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phuc T. Dang whose telephone number is (571) 272-1776. The examiner can normally be reached on 8:00 am-5:00 pm.

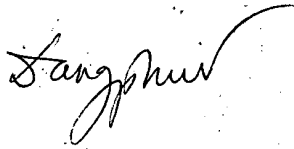
11. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Nelms can be reached on (571) 272-1787. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and After Final communications.

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12. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Phuc T. Dang

PD

A handwritten signature in cursive script, appearing to read "Phuc T. Dang", written in dark ink.

Primary Examiner

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